

## REMARKS

Claims 5-8, 10, and 14 are amended. Claims 1-14 are pending.

The amendments to the claims are based on the application as originally filed, so it is respectfully submitted that no new matter has been added. In particular, the amendments to claim 6 reciting that “after an activation period in the second step, a control function (OV) increases progressively with respect to time within a time domain ( $\Delta t$ )”, are supported in FIG. 4b and on page 7, lines 28-30 of the application as originally filed, corresponding to paragraph [0039] of the published application.

The amendments to claim 7 are supported by corresponding amendments to claim 5 in which it is recited that the “hand-held electric machine tool (1) [is] capable of operating in a selected operating mode”, which is supported by the mode selector switch 9 described on page 6, line 22 of the application as originally filed, corresponding to paragraph [0030] of the published application.

The amendments to claim 8 are supported on page 5, lines 11-13 of the application as originally filed, corresponding to paragraph [0020] of the published application.

In the office action, claims 6-8 were rejected under 35 U.S.C. § 112, second paragraph. Claims 6-8 have been amended in a manner believed to overcome the rejection under 35 U.S.C. § 112, second paragraph, and such amendments are supported by the application as originally filed, as described above. Therefore, reconsideration and withdrawal of the rejection of claims 6-8 under 35 U.S.C. § 112, second paragraph are respectfully requested.

In the office action, claims 1, 3, and 5-10 were rejected under 35 U.S.C. § 102(e) in view of U.S. Patent Number 6,892,826 to Giardino; claim 2 was rejected under 35 U.S.C. § 103(a) in

view of Giardino and U.S. Patent Number 4,410,846 to Gerber; and claims 4 and 11-14 were rejected under 35 U.S.C. § 103(a) in view of Giardino.

The applicants respectfully traverse the rejection in view of the cited art. It is respectfully submitted that the characterization by the Examiner of Giardino, column 4, lines 1-11 and 23-25, that “Giardino describes a sensor sensing impact pulses on an axial direction against a workpiece”, is incorrect.

Giardino is directed to a mechanical impact wrench which is designed to convey torque to a workpiece, with torque being a measure of rotational force, as opposed to an axially pressing force to a workpiece as in the present invention.

The applicants respectfully submit that the sensor 30 described in Giardino, column 3 and column 4, lines 1-11 and 23-25, does not measure any axially pressing force with which the hand-held electric machine tool is pressed against a workpiece, as in the present invention, but only measures tangentially directed impact pulses I. This is provable by the formula:

$$T = d(I r)/dt$$

found and described in Giardino, column 4, line 33-34, in which Giardino clearly teaches that the torque T of the mechanical impact wrench of Giardino is derived based on the impact pulses I, where r is the length of the torque arm.

In fact, one skilled in the art would not look to Giardino for the claimed invention, since Giardino teaches that the “Torque is preferably derived from the determination of ... Impulse I” (Giardino, column 4, lines 23-24).

It is noted that impulse I is defined as the integral of force F over time, as shown in column 4, lines 1-8. Since force is a vector quantity, so too is impulse I.

The formula  $T = d(I r)/dt$  disclosed in Giardino does not contain a vector cross-product of  $I$  and  $r$ , but this formula is misleading since it implies that torque  $T$ , impulse  $I$ , and the length of the torque arm are all measured in scalars.

Giardino recognizes in other contexts that vectors have direction, in that the angular momentum  $L$  is the cross-product of the torque arm  $r$  and linear momentum  $p$ , as shown in Giardino, column 4, lines 25-28.

One skilled in the art would recognize that, by the well-known definition of torque,

$$\vec{T} = \vec{F} \times \vec{r} \quad (1)$$

and so, based on the definition of impulse in Giardino, the formula on column 4, line 23-34 should be:

$$\vec{T} = \frac{d(\vec{I} \times \vec{r})}{dt} \quad (2)$$

and the scalar calculations of the magnitude should be  $T = d(I r \sin \theta)/dt$ , by the well-known definition of the magnitude of the vector product, where  $\theta$  is the angle between the vectors  $\vec{I}$  and  $\vec{r}$ . Only if the impulse  $\vec{I}$  and the torque arm  $\vec{r}$  are perpendicular does the magnitude of Equation (2) reduce to the formula  $T = d(I r)/dt$  shown in Giardino, column 4, line 33-34.

For the tool of Giardino, the torque  $\vec{T}$  is clearly axial, and the torque arm is the displacement from the rotational axis of the Giardino tool to the rotating portion of the socket 38 shown in FIG. 1 of Giardino.

Therefore, one having ordinary skill in the art would recognize that the impulse vector  $\vec{I}$ , having magnitude  $I$ , cannot be axially directed, but instead is a tangentially directed force applied by the socket 38 to the workpiece 40. The impulse vector  $\vec{I}$  must be tangentially directed to satisfy Equation (2).

This is confirmed by Giardino, column 4, lines 1-8, which defines the impulse I as the integral of force F over time. Force is, of course, a vector, and integration does not change its direction, so the impulse vector  $\vec{I}$  must be parallel to the force vector  $\vec{F}$ . Therefore, according to the well-known definition of Equation (1), force is perpendicular to torque, and torque is axially directed for the tool shown in Giardino, and so the impulse vector  $\vec{I}$  must be tangentially directed, and cannot be axially directed. Therefore, measurements of the impulse I by Giardino do not measure axially directed forces, as in the present invention.

One skilled in the art would recognize that the mechanical impact wrench of Giardino operates by applying tangential forces to workpieces, instead of the axially applied forces used in the present invention.

Moreover, Giardino specifically teaches that “sensor 30 is used to measure ... the impulse of the impacts” (Giardino, column 3, lines 53-55). Accordingly, Giardino teaches away from any other measurement of forces, including axially pressing forces as in the present invention.

Therefore, the impulse I in Giardino represents the magnitude of an impulse vector  $\vec{I}$  which is necessarily tangentially directed, and which is measured by sensor 30 of Giardino. Thus, Giardino does not disclose or suggest any “sensor sensing an axial pressing force” as in the present invention.

Accordingly, the applicants repeat and incorporate the previously arguments filed by the applicants in the amendment dated October 6, 2006, since such arguments distinguishing the present invention from Giardino are persuasive, including but not limited to the observation that the present invention uses a force sensor to measure the axial “pressing force (F)” of the tool pressing against the workpiece, which Giardino does not disclose or suggest.

Gerber does not cure the deficiencies of Giardino, since Gerber is cited for its alleged use of control electronics and discrete circuits having a potentiometer. Gerber does not disclose or suggest using a "sensor sensing an axial pressing force" as in the present invention.

Accordingly, one skilled in the art would not look to the combination of Giardino and Gerber for every element, step, and feature of the present invention, so independent claims 1 and 5 are patentable over Giardino and/or Gerber and are in condition for allowance.

Claims 2-4 and 6-14 depend from independent claims 1 and 5, and so include the recitation of claims 1 and 5, respectively. Therefore, for the reasons set forth above, claims 2-4 and 6-14 are also patentable over Giardino and/or Gerber.

Therefore, claims 1-14 are patentable over Giardino and/or Gerber, so reconsideration and withdrawal of the final rejection of claims 1-14 are respectfully requested.

Accordingly, entry and approval of the present amendment and allowance of all pending claims are respectfully requested.

In case of any deficiencies in fees by the filing of the present amendment, the Commissioner is hereby authorized to charge such deficiencies in fees to Deposit Account Number 01-0035.

Respectfully submitted,



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